

impossible is to give as the working principle of such a device some newly discovered and vaguely understood phenomenon, as for example, radioactivity. Many such devices have been in existence since the seventeenth century, and almost without exception the claims that are made for them are very great. If any genuine instrument were invented, its merits would no doubt in time become well recognized, as have those of other real inventions. The magnetic needle used in detecting iron ore is, of course, not included in this category of spurious instruments.

It is by no means true that all persons using a forked twig or some other device for locating water or other minerals are intentional deceivers. Some of them are doubtless men of good character and benevolent intentions. However, as anything that can be deeply veiled in mystery affords a good opportunity for swindlers, there can be no reasonable doubt that many of the large group of professional finders of water, oil, or other minerals who take pay for their "services" or for the sale of their "instruments" are deliberately defrauding the people, and that the total amount of money they obtain is large.

To all inquiries the United States Geological Survey therefore gives the advice not to spend any money for the services of any "water witch" or for the use or purchase of any machine or instrument devised for locating underground water or other minerals.

**DESICCATION OF AFRICA.**

[Nature, London, June 23, 1917, 99: 352.]

The journal of the East Africa and Uganda Natural History Society (v. 6, no. 11) contains an interesting paper by R. L. Harger on the desiccation of Africa. Reviewing the records on this theme by pioneers like Livingstone, Harris, and Selous, the author adds much valuable matter of his own covering a vast extent of country from Tanganyika southward and westward. There can be no question [says the reviewer in Nature] that the diminution of the chain of the great lakes and the river systems feeding them is proceeding at a most disconcerting rate, but the author makes no suggestion as to the causes to which this shrinkage is due.

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**EFFECT OF HUMIDIFICATION OF A SCHOOL ROOM ON INTELLECTUAL PROGRESS OF THE PUPILS.**

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Two divisions of a sixth grade of 43 pupils each who were of equal initial ability were treated alike in every respect save the dryness of the school room so far as was possible.

The experiment began on December 4, [1916?]. From then until March 30 the "dry" group did their school work for from four to five hours on five days of the week in a room without any humidification whose relative humidity averaged about 28.7 per cent. The "moist" group during the same period worked in a room of approximately 42.2 per cent relative humidity. The two groups were treated alike in respect to curriculum, teaching, and all other physical conditions of the air than moisture. Two teachers divided the work of teaching, one teaching certain subjects to both classes. The temperature was kept alike for both groups, averaging about 67.4° F. The rooms themselves were alike, the "moist" group beginning in room X which was then humidified by means of an air washer and changing at the middle of the period to room Y which was then humidified. The "dry" group began in room Y, kept as dry as the weather allowed, and changed at the middle of the period to room X, which in turn was then kept dry.

The ventilation of both rooms was controlled in all its details by the staff and plant of the New York State Ventilation Commission, the two schoolrooms having been specially built for experimental work. A full report of the detailed conditions during the experiment will appear later in the report of the commission. For our present purpose it may be accepted that the air conditions for the two groups differed only in dryness, and that the other conditions differed only by chance occurrences, apparently of little or no consequence.

The two groups were tested on December 4 and 5 and again on March 28, 29 and 30, with the following tests, taking in all about 7½ hours of each pupil's time on each occasion. \* \* \* Each pupil was given as a measure of gain in each test the difference between his score in the December test and his score in the same or similar test of March. These gains measure, roughly for each individual and accurately for the group, the increased knowledge and power which has accrued during the time of subjection to the dry and wet conditions.

When the gains in all the tests are combined so as to give approximately equal weight to each, \* \* \* it appears that the "dry" group makes a trifle better showing. Their superiority is, however, no greater than its probable error, and is only one seventh or eighth (according as medians or averages are used) of the mean square deviation of the group in improvement. So far as this experiment goes, then, we find no demonstrable effect of relative humidity on the intellectual progress of school children. What slight difference there is favors the dry condition.

This same substantial lack of difference is found when the gains of the two groups are compared in each test singly. \* \* \* The "dry" group shows more improvement in 9 tests, the "moist" group in 7, with equality in 3 tests. That the two groups were really of equal initial ability is shown by Table III (not reprinted) [which brings out] the superiority of the "dry" group—

By averages .....	0.79 ± 0.79
By medians .....	0.7 ± 1.0

It may be noted that an extensive series of observations of young women, made by the commission, with still more rigorous equalization of all influences save humidity, showed a result like that reported here for school children.<sup>1</sup> It may be noted also that physical examinations of the children at the beginning and end of the period showed similarly no demonstrable effect of the difference in air conditions, certainly none in favor of the humidified room. It appears unlikely, therefore, that the humidification of schoolrooms during winter will be productive of any improvement in their mental work.

The influence of humidity on comfort, health, and all forms of activity makes all researches such as the above, of general interest. While the brief communication here condensed concludes that humidification of schoolrooms during winter is unlikely to produce improvement in mental work, and this is an interesting result for the psychologist, yet it does not permit the heating engineer to conclude that the actual humidification there employed was without influence on the bodily comfort of the pupils. Perhaps this point will be treated of in the complete re-

<sup>1</sup> The psychological results of this study are reported in L. J. Stecher: The effect of humidity on nervousness and on general efficiency, *Archives of Psychology*, No. 38. Dec., 1916.

port, and this is the point usually of most interest to the student of outdoor and indoor climates.

It will be the first move of the climatologist to ascertain where in the United States one usually encounters relative humidities of the amounts experimented with. It appears from charts 17 to 23, inclusive, of MONTHLY WEATHER REVIEW SUPPLEMENT No. 6 (Washington, May, 1917) that the "moist" groups working under a relative humidity of about 42.2 per cent, experienced moisture conditions characteristic of afternoons in January in Utah, Colorado, Arizona, and New Mexico; of July afternoons in a narrow strip running from Williston, N. Dak., through North Platte, Nebr., to Del Rio, Tex.; this is, in fact, the average minimum relative humidity in July for the greater portion of such a strip and is 8 to 10 points lower than the average minimum July relative humidity along the Atlantic seaboard. The "dry" groups were working under an average relative humidity of 28.7 per cent, which is as low as the average minimum value for July throughout northern Iowa, central Wyoming, and central Colorado; and the average October minimum over Colorado from Denver westward, Utah, and Nevada. It is very closely the average afternoon humidity in April over the central portion of the Great Basin, while at the same season the "moist" group would have to be transported to the hills of Kentucky, West Virginia, and eastern Tennessee to find the humidity of their surroundings as low as 42.2 per cent.

In connection with this study it is also very interesting to compare the above results with those secured some years ago by Prof. E. G. Dexter in studying the effects of humidities on the deportment of school children in New York and in Denver.<sup>2</sup> His curve "Deportment—Relative humidity" shows that, under the conditions of nature, and not those artificially produced, there is "an excess of demerits for conditions of low humidity [50–55

per cent] compared with the numbers shown for a moist air [70–85 per cent]. \* \* \* Our inference for this curve must be that excessive restlessness, together with those activities of mind and body which, in the judgment of the teacher constitute disorder, increase with increasing dryness. Yet a dry atmosphere is recognized the world over as a vitalizing one, having the bracing properties which we all recognize in certain characteristics of weather. \* \* \* The teachers find that two tendencies on the part of the pupil are to be combated—inattention and roguishness; \* \* \* the former was more prevalent on stormy and wet days. The present study would tend to prove roguishness more common when the weather is dry and clear. \* \* \*

At Denver, Colo., "The seeming effects of extremely small humidities, from 10 to 45 per cent, is most startling, giving us an excess of floggings for the Denver school children of 400 per cent [of the normal based on normal Denver conditions]. The low humidity common to Colorado and the higher altitudes makes an excessive stimulus to nervous discharge a permanent one \* \* \*, but when the effect has not been sufficient to bring on other complications, the available energy for rightly directed motor discharge has been increased and some astonishing records are the result." The effect on the mental worker is also recognizable. Work is turned off under higher pressure and generally can not be so long maintained without a resultant partial collapse ensuing; so that the school year there is shortened in recognition of this greater drain on the pupils. It is rather surprising, in view of this widespread experience there, that the New York school tests quoted above show no speeding-up influence. Possibly the schoolroom air, artificially dried as it was, did not carry the same electrical condition that Dexter believes is the fundamental cause of the Colorado records.<sup>3</sup>—C. A., jr.

<sup>2</sup> Dexter, *Edu in Grant*. Weather influences. New York, 1904. Fig. 7, p. 108, and text pp. 123, etc.

<sup>3</sup> See also this REVIEW, March, 1915, 43: 135–6.